SIGMUND'S USABLITY STUDY
EXECUTIVE SUMMARY

(November 2014)

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EHR Usability Test Report of Sigmund Software

Product: Sigmund Software
Version: 3.8.620

Report based on ISO/IEC 25062:2006 Common Industry Format for Usability Test Reports

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Note: The following study was developed using the NISTIR 7742 template as a guide for reporting our findings: *Customized Common Industry Format Template for Electronic Health Record Usability Testing*.

Executive Summary

A usability test of Sigmund, version 3.8.620, a complete EHR was conducted throughout the month of November 2014 by Sigmund Software, LLC. The purpose of this test was to test and validate the usability of the current user interface, and to provide evidence of usability.

During the usability test, 4 healthcare professionals served as participants and used the EHR in simulated, but representative tasks.

This study collected performance data on 12 tasks typically conducted on an EHR. The tasks conducted were related to the following:

- Computerized Provider Order Entry
- Clinical Decision Support
- Clinical Information Reconciliation

During the 60 minute one-on-one usability test, each participant was greeted by the administrator and asked to review and sign an informed consent/release form (included in Appendix). Participants had prior experience with the EHR. The Moderator provided brief demonstration of new functionality implemented to satisfy Clinical Decision Support and Clinical Information Reconciliation The administrator introduced the test, and instructed participants to complete a series of tasks (given one at a time) using the EHR. During the testing, the administrator timed the test and, along with the data logger, recorded user performance data on paper. The administrator did not give the participant assistance in how to complete the task.

The following types of data were collected for each participant:

- Number of tasks successfully completed within the allotted time without assistance;
- Time to complete each task
- Number and types of errors
- Path deviations
- Participant's verbalizations
- Participant's satisfaction rating of the system

All participant data was de-identified – no correspondence could be made from the identity of the participant to the data collected. Following the conclusion of the testing, participants were asked to complete a post-test questionnaire. The following is a summary of the performance and rating data collected on the EHR.

No.	Task Description	# Participants	Task Success	Time to Complete (Avg)	Errors Total	Deviations Total	Avg Task Rating (*)
1	Add Radiology Order	4	Yes	54.25	0	0	1
2	Add Lab Order	4	Yes	32.75	0	0	1
3	Add E-Rx Medication	4	Yes	107.5	0	6	2
4	Trigger Clinical Decision Smoking Status Alert	4	Yes	36.5	0	0	1
5	Trigger Clinical Decision Influenza Alert	4	Yes	26.75	0	0	1
6	Trigger Clinical Decision Allergy Alert	4	Yes	22.75	0	0	1
7	Trigger Clinical Decision Medication Alert	4	Yes	22.75	0	0	1
8	Trigger Clinical Decision Problem List Alert	4	Yes	45.50	0	0	2
9	Trigger Clinical Decision Lab Result Alert	4	Yes	45.50	0	0	2
10	Trigger Clinical Decision Combined Alert	4	Yes	56.75	1	0	2
11	Trigger Clinical Decision Vital Signs Alert	4	Yes	38.75	0	0	1
12	Merge CDA into current patient record	4	Yes	82.25	0	0	2

(*) Task Rating: 1= Very Easy, 2=Somewhat Easy, 3=Neither Easy or Difficult, 4= Difficult, 5=Very Difficult

In addition to the performance data, the following qualitative observations were made:

1. Major Findings

2. Areas for Improvement

Introduction

The EHR tested for this study was Sigmund Software, version 3.8.620, a complete EHR. Designed to present medical information to healthcare providers in ambulatory behavioral healthcare settings, the EHR allows providers to maintain clinical information related to their patients. The usability testing attempted to represent realistic exercises and conditions.

The purpose of this study was to test and validate the usability of the current user interface, and provide evidence of usability in the EHR under test. To this end, measure of effectiveness, efficiency (time to perform tasks; total number of deviations; total number of errors; etc.) were captured during the usability testing.

Method

Participants

A total of 4 participants were tested on the EHR. Participants were contacted by Sigmund Software, LLC staff to participate in the study. In addition, participants had no direct connection to the development of the EHR. Participants were from 4 separate behavioral healthcare facilities who are current clients of Sigmund Software LLC. Participants were not from Sigmund Software LLC. All participants had the same level of training as all other actual end users.

The following is a table of participants by characteristics, including demographics, user role, and product experience. Participant names were replaced with Participant IDs so that an individual's data cannot be tied back to individual identities. A summary of the participant demographics can be found in the Appendix.

Participant ID	Gender	Education	Occupation/Role	EMR Experience (Years)
1	F	AA/BS	LPN	15+
2	M	Degree in Practical Nursing	LPN	3
3	M	MD	Physician/Chief Medical Officer	10+
4	F	Masters in Clinical Psychology	Clinical Support/Therapist	4

100% of all participants recruited for the test showed up to participate in the test.

Participants were advised that the test would take 45 minutes; but to allocate 60 minutes for the test. The added 15 minutes was to provide enough time for administrator instructions and time between tasks.

Study Design

Overall, the objective of this test was to uncover areas where the application performed well – that is, effectively, efficiently, and with satisfaction – and areas where the application failed to meet the needs of the participants. The data from this test may serve as a baseline for future tests with an updated version of the same EHR and/or comparison with other EHRs provided the same tasks are used. In short, this testing serves as both a means to record or benchmark current usability, but also to identify areas where improvements must be made.

During the usability test, participants interacted with 1 EHR. Each participant was provided the same set of instructions. The system was evaluated for effectiveness and efficiency as defined by measures collected and analyzed for each participant.

- Number of tasks successfully completed within the allotted time without assistance;
- Time to complete each task
- Number and types of errors
- Path deviations
- Participant's verbalizations
- Participant's satisfaction rating of the system

A number of tasks were constructed that would be realistic and representative of the kinds of activities a user might do with this EHR, including:

- Add Radiology Order
- Add Lab Order
- Add E-Rx Medication
- Trigger Clinical Decision Smoking Cessation Alert
- Trigger Clinical Decision Influenza Alert
- Trigger Clinical Decision Allergy Alert to Document Allergies
- Trigger Clinical Decision Medication Alert to Document Medications
- Trigger Clinical Decision Problem Alert for Dementia
- Trigger Clinical Decision Lab Result Alert for Abnormal Cholesterol
- Trigger Combined Clinical Decision Alert for Diagnosis of Diabetes without Hemoglobin Lab Result
- Trigger Vital Signs Alert(s) to Document BMI or BMI Follow-up When BMI is Out of Range
- Merge CDA into an active patient's record

Tasks were selected based on their frequency of use, criticality of function, and those that may be most troublesome for users.

Procedures

Upon arrival, participants were greeted and their identity was verified and matched with the participant's name on the schedule. Participants were then assigned a participant ID. All participants signed an informed consent form prior to the testing. The test administrator witnessed each participant's signing of the consent form.

To ensure that the test ran smoothly, two Sigmund staff members participated in the administration of the test. The test administrator provided the instructions for each test, and noted all comments from the participants; while the data logger noted all times, deviations and errors.

Participants were instructed to perform the tasks:

- After listening to the instructions from the testing administrator
- As quickly as possible
- Without assistance

Task timing began after the completion of the verbal instructions from the administrator; and after an acknowledgement from the participant that they were ready to begin. The task time was stopped once the participant indicated they had successfully completed the task.

Following the test, the administrator gave the participant the post-test questionnaire; and then thanked them for their time.

The Sigmund staff member responsible for logging data recorded all participants' demographic information, task success rate, task time to complete task, errors, and deviations into a spreadsheet.

Test Location

The test was administered in a setting where participants were isolated from other participants in the study. The test was conducted remotely via an online "GoTo Meeting" session, giving the participant keyboard and mouse control of the Test Administrator's desktop application. Only the test administrator and logger were with the participants while the study was being administered. To ensure that the environment was comfortable for users, noise levels were kept to a minimum.

Test Environment

The EHR would typically be used in a healthcare facility. In this instance, testing was conducted remotely via an online "GoTo Meeting" session, giving the participant keyboard and mouse control of the Test Administrator's desktop application which was physically located at Sigmund Software's corporate office in a closed room. The computers used for the testing were PCs running on Windows 7. Users also used a mouse and keyboard while interacting with the EHR. The Sigmund application is a desk top solution. The application itself was running on Windows 7 local installation using a test database. All participants indicated that system performance during the test was what they were used to seeing during their typical work day.

Test Forms and Tools

During the usability test, various instruments and documents were used, including:

- Informed consent & Non-Disclosure Agreement
- Moderator guide
- Post-test questionnaire

Examples of these documents are to be found in the Appendix section.

Participant Instructions

The Administrator read the following instructions aloud to each participant:

"Thank you for participating in today's usability study of Sigmund. In a few minutes, you will be asked to perform a series of tasks and complete a user survey. Please attempt to complete each task as quickly as possible. The idea behind this study is for Sigmund to obtain information on where enhancements are needed in the application based on how quickly, and easily, tasks are being performed in Sigmund."

Following the procedural instructions, participants were shown the EHR and as their first task, were given 15 minutes to explore the system and make comments and ask questions. Once this task was complete, the administrator gave the following instructions.

"When it is time to perform each task, I will state the instructions and then tell you to begin. Once you have completed the task, please say 'Done'. After you have completed the task, I will ask for feedback on the actions you had taken during the task. You will be given a specified amount of time to complete each task. This time will not be communicated to you as we are interested in seeing how long each task does take for you to perform."

Usability Metrics

The goals of this test were to assess:

1. The efficiency of Sigmund by measuring the length of time it takes for a user to complete specific tasks; and the total number of tasks successfully completed during the study.
2. The efficiency of Sigmund by measuring the path deviations taken by the user during the tasks.
3. The effectiveness of Sigmund by measuring the number and types of errors experienced by the user during the tasks.
4. The satisfaction of the user with Sigmund by logging their comments on the tasks.

Data Scoring

The table below details how each task was scored.

Measure	**Rationale and Scoring**
Task Time	Timing started when the administrator said 'Begin'. The time ended when the participant said 'Done'. In the event that the participant finished, and did not say 'Done', the administrator stopped the clock when it was clear the participant had completed the task. Task times were only counted if the participant completed the task in the allotted time. The average time per task was calculated for each task.
Errors	The task resulted in an error if the participant: failed to finish the task or if they became 'stuck' and could not proceed without asking for assistance. Task time was not counted when the task resulted in an error. We calculated the error % for each task by taking the total number of errors for each task and divided that number by the total attempts at the task.
Path Deviations	Path deviations were recorded as actions taken during the task that were not part of the necessary actions needed to complete the task. We calculated path deviations by taking the total number of observed deviations and dividing that number by the total number of steps taken using an optimal path.
Task Success	A task was considered a success if the participant completed the task in the allotted time. To calculate the task success rate, we simply divided the total number of successful tasks by the total number of tasks completed. The time designated for each task was determined by taking the optimal time to complete the task and multiplying it by a factor of 1.25 to allow for those users that may not have been fully trained on the application.

Results

Data Analysis and Reporting

The results of the usability test were calculated according to the methods specified in the Usability Metrics section above.

The testing results for Sigmund are detailed below. The table below easily identifies the tasks performed and the performance level for each task.

No.	Task Description	# Participants	Task Success	Time to Complete (Avg)	Errors Total	Deviations Total	Avg Task Rating (*)
1	Add Radiology Order	4	Yes	54.25	0	0	1
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7	Trigger Clinical Decision Medication Alert	4	Yes	22.75	0	0	1
8	Trigger Clinical Decision Problem List Alert	4	Yes	45.50	0	0	2
9	Trigger Clinical Decision Lab Result Alert	4	Yes	45.50	0	0	2
10	Trigger Clinical Decision Combined Alert	4	Yes	56.75	1	0	2
11	Trigger Clinical Decision Vital Signs Alert	4	Yes	38.75	0	0	1
12	Merge CDA into current patient record	4	Yes	82.25	0	0	2

(*) Task Rating: 1= Very Easy, 2=Somewhat Easy, 3=Neither Easy or Difficult, 4= Difficult, 5=Very Difficult

Effectiveness

One Participant did experience minor error while executing tasks due to inexperience with newer functionality. All tasks were successfully executed during the study.

Efficiency

Participants in the study, followed the optimal paths to complete the assigned tasks with minimal deviations. However, did comment on the number of clicks that are sometimes required to complete an action. Mixed feedback was received on the ease of the E-Rx functionality Comments were made on the new interfaces for the CDA Reconciliation and Clinical Decision Support as to some minor enhancements and how they would work in their respective environment.

Satisfaction

All participants expressed they found Sigmund to be "user friendly".

Major Findings

The study showed no major findings. Participants verbalized both their happiness with the system's workflow and expressed ideas for some minor enhancements.

Areas for Improvement

The study confirmed that documentation would assist end users in implementing new workflow to aid in best using Sigmund to achieve Meaningful Use.

Appendices

Sample Consent Form

Participant Consent

Sigmund Software
Usability Study
Consent Form

Sigmund Software would like to thank you for your participation in this study. The purpose of the study is to evaluate the usability of the Sigmund Software's EMR. Your participation in this study will include performing specific tasks within Sigmund and completing a short survey following the study. The study should take approximately 30 minutes. The information collected by Sigmund during the study is for research purposes only. Your participation in this study is voluntary, so you are free to withdraw at any point during the study.

By signing below, I agree to participate in the study.

Name of Participant	
Education	
Occupation/Role	
Professional Experience	
Years of EMR Experience	
Location	
Date of Study	

Signature - Participant Date

Printed Name Date

Signature -Witness Date

Printed Name Date

Sample Non-Disclosure Agreement

Non-Disclosure Agreement

Sigmund Software
Usability Study
Non-Disclosure Agreement

THIS AGREEMENT is entered into as of _____2014, between _____ ("the Participant") and Sigmund Software LLC, located at 2505 Carmel Avenue, Brewster, NY 10509 ("the Test Company").

The Participant acknowledges his or her voluntary participation in today's usability study may bring the Participant into possession of Confidential Information. The term "Confidential Information" means all technical and commercial information of a proprietary or confidential nature which is disclosed by Test Company, or otherwise acquired by the Participant, in the course of today's study.

By way of illustration, but not limitation, Confidential Information includes trade secrets, processes, formulae, data, know-how, products, designs, drawings, computer aided design files and other computer files, computer software, ideas, improvements, inventions, training methods and materials, marketing techniques, plans, strategies, budgets, financial information, or forecasts.

Any information the Participant acquires relating to this product during this study is confidential and proprietary to Test Company and is being disclosed solely for the purposes of the Participant's participation in today's usability study. By signing this form the Participant acknowledges that s/he will NOT receive monetary compensation for feedback and will not disclose this confidential information obtained today to anyone else or any other organizations.

Participant's printed name: _____

Signature: _____ Date: _____

Participant Demographics

Gender

Male 2
Female 2

Total Participants 4

Occupation/Role

LPN (2)
Physician (1)
Clinical Therapist (1)

Total Participants 4

Product Experience

All participants had minimum of 3 years EMR experience.

Sample Post-Test Questionnaire

Post Test Questionnaire
Sigmund Software User Summary

1. What was your overall impression of the system?
2. What did you like the most about the system? What did you like the least about the system?
3. If you could change one part of Sigmund, what would you change?
4. Were there any features that surprised you?
5. What features did you expect to see but were absent?
6. If you could add one piece of functionality to Sigmund, what would you add?

Comments, Suggestions

Areas for Improvement

Moderator Guide

See Attachment 1

Designated Task Times

No.	Task Description	Time Designated (Seconds)
1	Add Radiology Order	30
2	Add Lab Order	30
3	Add E-Rx Medication	116
4	Trigger Smoking Status Alert	34
5	Trigger Influenza Alert	28
6	Trigger Medication Allergy Alert	22
7	Trigger Medication Alert	22
8	Trigger Problem List Alert	30
9	Trigger Lab Result Alert	25
10	Trigger Combined Alert	30
11	Trigger Vital Signs Alert	41
12	Merge CDA into current patient record	75